

**We claim:**

1. An oriented strand board composite structure comprising:  
a first oriented strand face having a layer of wood flakes mixed with a  
thermoset resin binder;  
a second oriented strand face having a layer of wood flakes mixed with a  
thermoset resin binder; and  
a core provided between said first oriented strand face and said second  
oriented strand face, said core comprising a perforated mat that is oriented such  
that the perforation boundaries are essentially orthogonal to the orientation of  
said first and second oriented strand faces.
2. A structure according to Claim 1, wherein said core further comprises  
inorganic filler in the amount of about 10% to 80% by weight.
3. A structure according to Claim 2, wherein said inorganic filler is one or  
more of clay, calcium carbonate, and titanium dioxide.
4. A structure according to Claim 1, wherein said perforated mat is  
perforated such that it comprises between 0% and 75% voids by volume and  
wherein said core further comprises resin binder in an amount of less than 10%  
by weight.
5. A structure according to Claim 1, wherein said perforated mat is  
perforated such that it comprises between 0% and 50% voids by volume and  
wherein said core further comprises resin binder in an amount of less than 5% by  
weight.

6. A structure according to Claim 1, wherein said perforated mat consists essentially of paper mill sludge.

7. A structure according to Claim 1, wherein said perforated mat consists essentially of recycled paper.

8. A structure according to Claim 1, wherein said perforated mat consists essentially of vulcanized rubber.

9. A structure according to Claim 1, wherein said perforated mat consists essentially of thermoset plastics.

10. A structure according to Claim 4, wherein said perforated mat comprises one or more of paper mill sludge, recycled paper, vulcanized rubber, thermoset plastics, and volcanic rock.

11. An oriented strand board composite structure comprising:  
a first oriented strand face having a layer of wood flakes mixed with a thermoset resin binder;  
a second oriented strand face having a layer of wood flakes mixed with a thermoset resin binder; and  
a core provided between said first oriented strand face and said second oriented strand face, said core comprising a plurality of individual chunks of compression-resistant material that are oriented such that void boundaries are in a direction essentially orthogonal to the orientation of said first and second oriented strand faces.

12. A structure according to Claim 11, wherein said core further comprises inorganic filler in the amount of 10% to 80% by weight.

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13. A structure according to Claim 12, wherein said inorganic filler comprises one or more of clay, calcium carbonate, and titanium dioxide.

14. A structure according to Claim 11, wherein said core comprises between  
5 0% and 75% voids by volume and wherein said core further comprises resin binder in an amount of less than 10% by weight.

15. A structure according to Claim 11, wherein said core comprises between  
10 0% and 50% voids by volume and wherein said core further comprises resin binder in an amount of less than 5% by weight.

16. A structure according to Claim 11, wherein said compression-resistant material consists essentially of paper mill sludge.

15 17. A structure according to Claim 11, wherein said compression-resistant material consists essentially of wood chips.

18. A structure according to Claim 11, wherein said compression-resistant material consists essentially of recycled paper.

20 19. A structure according to Claim 11, wherein said compression-resistant material consists essentially of vulcanized rubber.

25 20. A structure according to Claim 11, wherein said compression-resistant material consists essentially of thermoset plastics.

21. A structure according to Claim 11, wherein said compression-resistant material consists essentially of volcanic rock.

22. A structure according to Claim 14, wherein said compression resistant material comprises one or more of paper mill sludge, wood chips, recycled paper, vulcanized rubber, thermoset plastics, and volcanic rock.

5 23. A method for manufacturing an oriented strand board comprising the steps of:

depositing a first layer of wood flakes mixed with a thermoset resin binder, with a horizontal orientation;

10 depositing a core layer of a perforated mat on an upper surface of the first layer of wood flakes so that the perforation boundaries are essentially orthogonal to the orientation of the first layer of wood flakes;

depositing a second layer of wood flakes mixed with a thermoset resin binder on an upper surface of the core layer with the same horizontal orientation as that of the first layer of wood flakes; and

15 applying heat and pressure to the layers in a single hot pressing step.

24. A method according to Claim 23, wherein the perforated mat comprises 0% to 75% voids by volume.

20 25. A method according to Claim 23, wherein the perforated mat comprises 0% to 50% voids by volume.

26. A method according to Claim 23, further comprising the step of adding inorganic filler to the core layer in the amount of 10% to 80% by weight.

25 27. A method according to Claim 26, wherein said inorganic filler is one or more of clay, calcium carbonate, and titanium dioxide.

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28. A method according to Claim 23, wherein the perforated mat comprises one or more of paper mill sludge, recycled paper, vulcanized rubber and thermoset plastics.

5 29. A method according to Claim 23, wherein the perforated mat comprises paper mill sludge.

30. A method according to Claim 29, further comprising the step of adding resin binder to the perforated mat in an amount of less than 5% by weight.

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31. A method for manufacturing an oriented strand board, comprising the steps of:

depositing a first layer of wood flakes mixed with a thermoset resin binder, with a horizontal orientation;

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depositing a core layer of a plurality of individual chunks of compression-resistant material that are oriented such that the void boundaries are orthogonal to the orientation of the first layer of wood flakes;

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depositing a second layer of wood flakes mixed with a thermoset resin binder on an upper surface of the core layer with the same horizontal orientation as that of the first layer of wood flakes; and

applying heat and pressure to the layers in a single hot pressing step.

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32. A method according to Claim 31, wherein the core is deposited, in said depositing of core layer step, such that the core comprises 0% to 75% voids by volume.

33. A method according to Claim 31, wherein the core is deposited, in said depositing of core layer step, such that the core comprises 0% to 50% voids by volume.

to Claim 31, further comprising the amount of 10% of the amount of Claim 34, where the amount of 10% is the amount of iron, and titanium of the amount of Claim 31, where the amount of 10% is the amount of sludge, wood and volcanic rock.

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